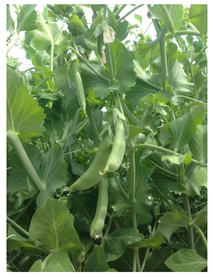
Evaluation of Six Edible-Pod Pea Varieties as a Potential High Value Crop in the U.S. Virgin Islands



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Abstract

Snow peas (*Pisum sativum* L. var. saccharatum) and Snap peas (*Pisum sativum* L. var. macrocarpon) are high value vegetables typically grown in temperate regions. Three cultivars of snow peas: 'Oregon Giant'(OG), 'Mammoth Melting'(MM), 'Little Sweetie'(LS), and three cultivars of snap peas: 'Cascadia'(CA), 'Sugar Sprint'(SS), and 'Super Sugar Snap'(3S) were grown at the University of the Virgin Islands, Agriculture Experiment Station, St. Croix, US Virgin Islands. The experimental design was a complete randomized block consisting of six cultivar treatments with four replications. Prior to planting, trellises were constructed by stretching 1.5 meter tall plastic mesh fencing between metal posts at 3 meter intervals. Peas were hand planted on Feb 4, 2014 in double rows with individual peas spaced at 7.6 cm and rows spaced at 1 meter for a total of 262,466 plants/ha. Peas were micro-irrigated daily based upon soil moisture and fertigated weekly at a rate equivalent to 67 kg/ha nitrogen using a commercial 20-20-20 fertilizer. There was no difference in germination rate observed between cultivars (89-93%).

Data on total, marketable and non-marketable pod yield were collected bi-weekly for a total of 10 harvests. Plant height and °Bx measurements were collected during the growing season. The snow pea cultivar LS produced the highest total fruit yield for the season across all cultivars at 14,306 kg/ha ($p \leq 0.0002$). Of the three sugar snap cultivars tested, 3S yielded 9,042 kg/ha which was greater than CA, MM and SS ($p \leq 0.05$), but similar to OG. Non-marketable fruit for LS was 1,691 kg/ha which was similar to OG, MM, and 3S, but greater than CA and SS ($p \leq 0.01$). However, non-marketable fruit for LS represented 12 percent of the total harvest which was similar to all other cultivars, except MM (27% non-marketable fruit). Five cultivars were similar in °Bx for SS, 3S, CA, and OG at 11.0, 11.0, 10.8, and 10.2, respectively, while all three sugar snap cultivars had higher °Bx (% soluble solids) than MM and LS at 9.8 and 9.5, respectively ($p \leq 0.05$). The snow pea cultivar LS was higher yielding, but had the lowest sugar content. The sugar snap cultivar 3S had acceptable fruit yield and had equally as high °Bx as the other sugar snap cultivars. Results of this experiment indicate that both sugar snap and snow pea varieties have potential as a short season specialty high value crop when grown in the cooler months on St. Croix, USVI.

Introduction

Snow pea (*Pisum sativum* var. saccharatum) and Snap pea (*Pisum sativum* var. macrocarpon) are high value vegetable crops typically grown in temperate regions. Sugar snap peas and snow peas lack the inner pod fiber of typical garden peas and are harvested before seed maturity for the fresh or fresh-pack market (McGee, 2012). Three cultivars of Snow 'Oregon Giant'(OG), 'Mammoth Melting'(MM), 'Little Sweetie'(LS), and three cultivars of Snap pea 'Cascadia'(CA), 'Sugar Sprint'(SS), and 'Super Sugar Snap'(3S) were grown at the UVI Agriculture Experiment Station, St. Croix, US Virgin Islands.

Objectives

Cultivars were evaluated on rate of germination, plant height, marketable and unmarketable fruit weight and their °Bx.

Harvest	Days After Planting
1	57
2	62
3	65
4	69
5	72
6	76
7	79
8	82
9	85
10	90

Table 1: Harvest schedule

Figure 1: Top- Lepidoptera inside a pod.
Bottom- Immature Pentatomidae

Figure 2: Experimental Pea Field at AES

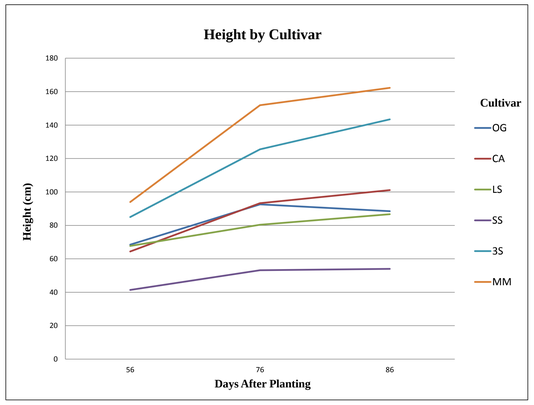

Figure 3: Plot of pea pod varieties height in centimeters by days after planting

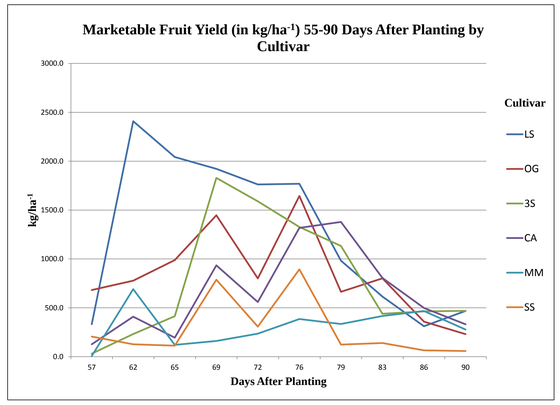

Figure 4: Plot of pea pod varieties weight in kg/ha^{-1} by days after planting

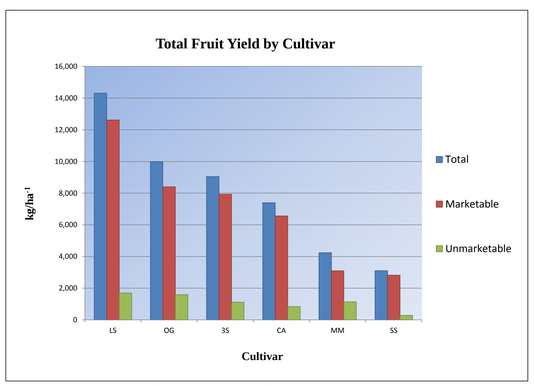

Figure 5: Graph of total fruit yield in kg/ha^{-1} by pea pod variety

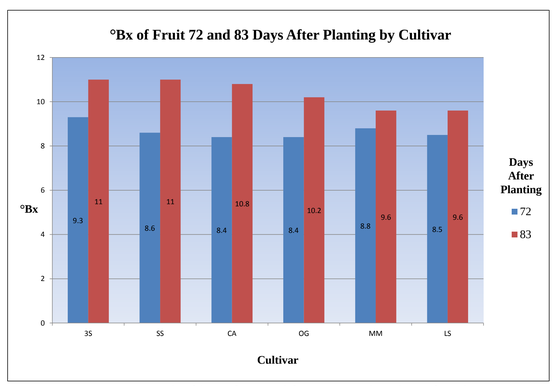

Figure 6: Comparison graph of °Bx of pea pod fruit at 72 and 83 days after planting

Materials and Methods

The experimental design was a complete randomized block with four replications for each cultivar grown in the field, where one replicated trial was conducted in Spring 2014. Drip irrigation lines with a ½" diameter (1.27 cm) and 4 inch emitter spacing (10.2 cm) and "T" fencing posts were placed in the field prior to direct seeding. Posts were spaced every 3 m and 1.5 m tall plastic fencing was secured to the posts to provide a trellis system for support of plant varieties. Seeds were procured from Twilley Seed, Willhite Seed Inc. and Stokes Seed Company and hand planted directly into the field. Plots consisted of three rows spaced 1 m apart, with 80 plants per row spaced 7.6 cm between plants within a row. The field was periodically monitored for soil moisture content, insect pests and plant diseases by staff. Insect pests were controlled using *Bacillus thuringiensis* and a pyrethrin based spray. Weeds were controlled manually, mechanically and hay mulch was applied 36 Days After Planting (DAP). A commercial fertilizer was applied at an equivalent of 67 kg/ha through an injector during irrigation. Harvests were on a bi-weekly basis (Table 1.) and ran for a total of 6 weeks with 10 harvest events. Plant heights were recorded 57, 76, and 86 DAP respectively. °Bx recordings were taken 72 and 82 DAP using a refractometer.
Data were analysed using GLM procedures of SAS with
marketable fruit yield, height by cultivar, °Bx by cultivar, and total fruit yield by cultivar as the main effects in the model.

Results and Discussion

MM was observed as the tallest height (Fig.3) showing a difference at harvest 6 and 9 ($p \leq 0.0001$) at 151.89 cm and 162.3 cm respectively.
Plant height for 3S was lower to MM ($p \leq 0.0001$) but higher compared to other varieties 76 and 85 DAP.
SS had the lowest height during recordings at 76 and 85 DAP, measuring 53.21 cm and 53.97 cm respectively.

The snow pea cultivar LS produced the highest total fruit yield for the season across all cultivars (Fig. 5.) at 14,306 kg/ha ($p \leq 0.0002$).
Of the three sugar snap cultivars tested 3S had the highest yield at 9,042 kg/ha, which was greater than MM and SS ($p \leq 0.05$), but similar to OG and CA. MM and SS were similar in yield, producing 4,237 kg/ha and 3,103 kg/ha respectively.
Non-marketable fruit (Fig. 5) for LS was 1,691 kg/ha which was similar to OG, MM, and 3S, but greater than CA and SS ($p \leq 0.01$). However, non-marketable fruit for LS represented 12 percent of the total harvest which was similar to all other cultivars, except MM (27% non-marketable fruit).

3S had the highest sugar content (Fig. 6) at 9.3 °Bx 72 DAP which was similar to MM (8.8) and SS (8.6), but greater than LS, CA and OG at 8.5, 8.4, and 8.% respectively. °Bx was similar 82 DAP for SS, 3S, CA, and OG at 11.0, 11.0, 10.8, and 10.2, respectively, while all three sugar snap cultivars had higher °Bx than MM and LS at 9.8 and 9.5, respectively ($p \leq 0.05$).

The snow pea cultivar LS was higher yielding, but had the lowest °Bx content. The sugar snap cultivar 3S had acceptable fruit yield and had equally as high °Bx as the other sugar snap cultivars.

There was no difference in germination percent by varieties. Insects and pests observed include Lepidoptera and Pentatomidae.

References

Pavek, P.L.S. 2012. Plant guide for pea (*Pisum sativum* L.). USDA-Natural Resources Conservation Service, Pullman, WA.

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